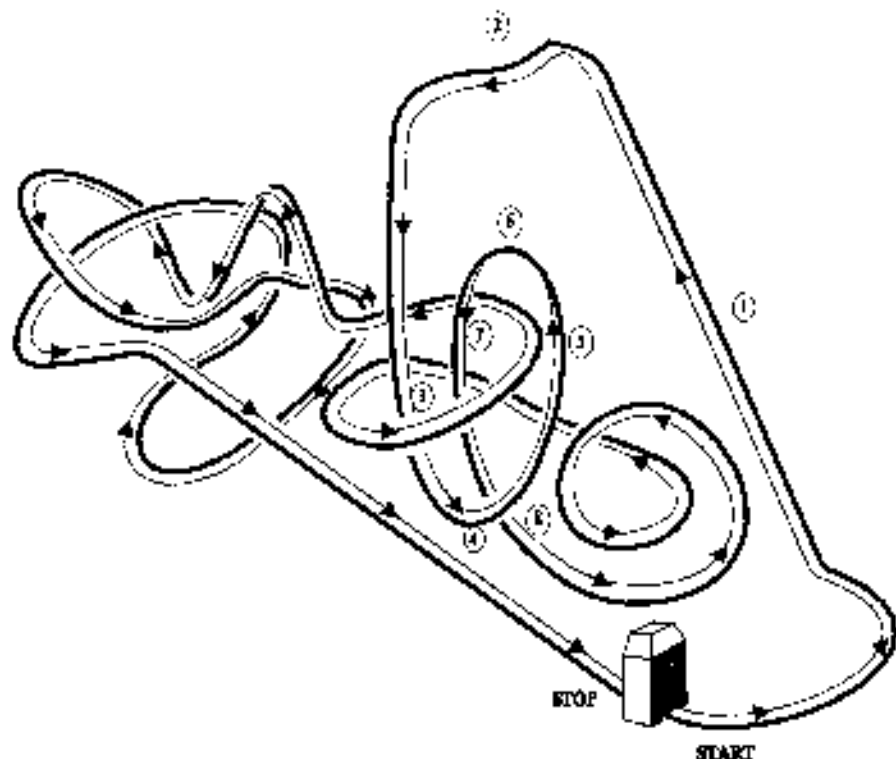


IRON WOLF®



1. A roller coaster may be thought of as an energy conversion machine. Beginning with the lifting of the cars and passengers to the top of the first hill and finishing with the roller coaster being brought to rest at the end of the ride, describe the energy conversion processes that take place for the entire ride. Refer to sketch above to assist you with this task.
2. The spiral portion of the Iron Wolf track becomes progressively more banked as one proceeds from top to bottom. Why do you think the track is designed this way?
3. What prevents you from falling when you travel around the top of a vertical loop? Place a coin in the palm of your hand while riding through the vertical loops. Does the coin leave your hand? Why or why not?
4. While traveling up the incline to the maximum height of the Iron Wolf:
 - (a) Does gravity do negative work, positive work, or no net work?
 - (b) Is the work done by the chain positive, negative, or zero?
 - (c) Is the work done by the track positive, negative, or zero?
5. Does the power needed to drag the Iron Wolf up the first incline depend on the time it takes to reach the top? Please explain. Does the amount of work needed to drag the train up the first incline depend on the time of transit? Explain.
6. What is your speed at the bottom of the first high rise? Does the "twist" in the initial drop effect the final speed at the bottom? Explain.

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7. Estimate the minimum horsepower needed to haul the roller coaster and its contents up the high rise. Calculate the force due to the chain needed to haul the roller coaster and its contents up the high rise. Compute the ratio between the force of the chain and the force of the track as the Iron Wolf travels along the high rise.
8. Assume you are able to ride two roller coasters. One roller coaster allows you to sit down while traveling through a vertical loop. The second roller coaster allows you to stand while traveling through the same vertical loop. Assuming all other factors to be equal, will there be a greater force due to the seat for roller coaster #1 (sitting down) or a greater force against your feet for roller coaster #2 while traveling through the vertical loop? Please explain your answer.
9. Use the diagram on the previous page and record the location of the following:
- | | |
|---|---|
| <input type="checkbox"/> Maximum speed | <input type="checkbox"/> Maximum kinetic energy |
| <input type="checkbox"/> Minimum speed | <input type="checkbox"/> Minimum kinetic energy |
| <input type="checkbox"/> Maximum potential energy | <input type="checkbox"/> Weightless sensation |
| <input type="checkbox"/> Minimum potential energy | <input type="checkbox"/> Heavy sensation |